SQRD4G15B CHARGING SYSTEM

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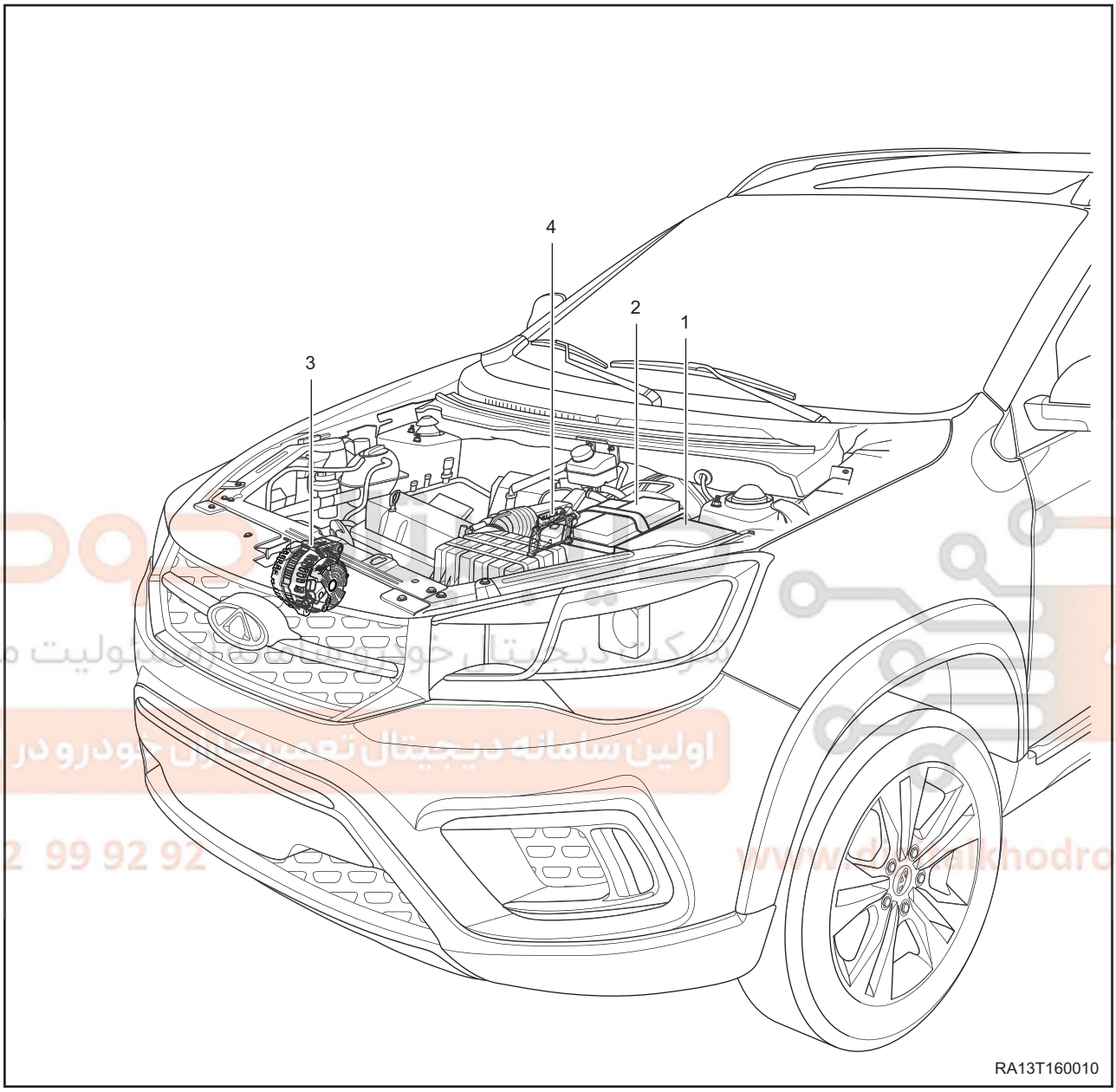
GENERAL INFORMATION

Description



1 - Fuse and Relay Box	2 - Battery
3 - Alternator	4 - ECM

Alternator is a key component of charging system. As one of main power sources of the vehicle,it is a device that converts mechanical energy into electrical energy and generates DC voltage. The alternator operates as a complete assembly. If alternator fails for any reason, the entire unit must be replaced.

Alternator Operation

Alternator is a silicon rectifying alternator, which mainly consists of rotor, stator and rectifier.

When direct current flows to rotor winding, rotor claws energize magnetic field to produce alternating induced electromotive force. Stator is installed outside of rotor, which is secured together with front and rear end covers of alternator. When alternator rotor is rotated by drive belt, magnetic pole lines cut stator winding, causing a change in magnetic flux of stator winding, generating an induced electromotive force, producing alternating current. Three-phase alternating current generated by alternator is converted to direct current from alternating current by rectifier, and direct current is transmitted to the vehicle electrical system and battery.

Specifications

Torque Specifications

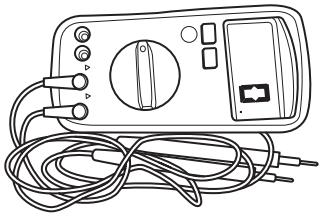
Description	Torque (N·m)
Battery Pressure Plate Fixing Bolt	7 ± 1.5
Coupling Bolt Between Battery Tray and Air Filter Assembly	10 ± 1
Battery Tray Fixing Bolt	25 ± 4
Alternator Output Cable Fixing Nut	18 - 22
Alternator Fixing Bolt	25 ± 3
Alternator Bracket Fixing Nut	45 ± 5
Alternator Bracket Fixing Bolt	45 ± 5

Battery Specification

Item	Type	Specification
SQRD4G15B	L2 400	12 V, 60 Ah, 480 A

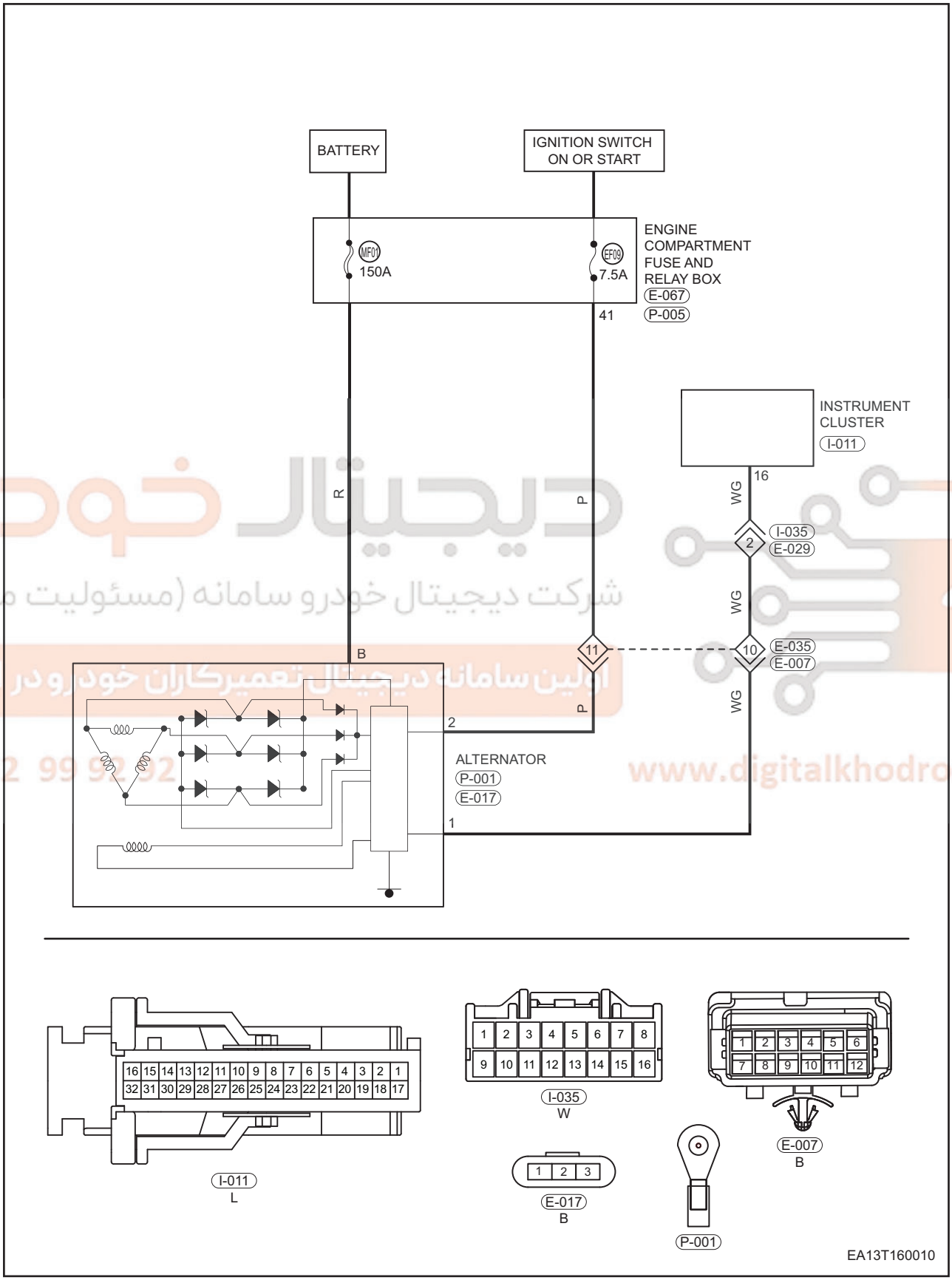
Tool

General Tool

Digital Multimeter	 RCH0000002

Circuit Diagram

Charging System



DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:
Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Suspected Area	See page
Charging system warning light comes on after engine starts	Alternator	16-10
	Instrument cluster	38-13
	Wire harness	-
Noises are heard from alternator after engine starts	Fixing bolt (loose)	16-10
	Accessory drive belt (misaligned, loose or fault)	07-19
	Alternator	16-10

Charging System Charging Voltage Inspection

1. Leave vehicle under no load test condition and idle engine. Measure battery voltage with a digital multimeter. Standard voltage: 13 ± 0.3 V

   If result is not as specified, replace the alternator (See page 16-10).

2. Leave vehicle under load test condition and idle engine. Measure battery voltage with a digital multimeter.

   Load test condition:

   - Set headlight to high beam;
   - Turn on blower and adjust blower speed to the highest;
   - Turn on the "A/C" switch.
   - Turn cold-hot switch to adjust temperature of outlet to the highest.

   Standard voltage: 14.1 ± 0.3 V.

   If result is not as specified, replace the alternator (See page 16-10).

CAUTION

- If charging system warning light comes on, charging system may have a malfunction.
- If noises are heard from alternator or generating capacity is extremely high or low, check and repair or replace the alternator.

ON-VEHICLE SERVICE

Battery

On-vehicle Inspection

1. Check that battery terminals are not loose or corroded. If battery terminals are corroded, clean them.
2. Check battery for damage, deformation or leakage. If serious damage, deformation or leakage is found, replaced the battery.
3. Check the battery voltage.

   Turn ignition switch to on, and turn it off 20 to 30 seconds after turning on headlight. This will eliminate the surface charge on battery. Measure battery voltage with a digital multimeter.

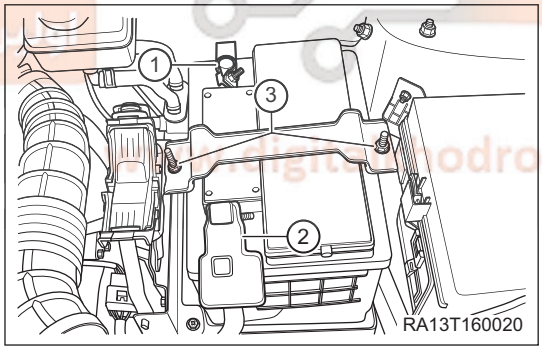
Measurement Temperature	Specification
20°C	12 - 13 V

Removal

CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the ignition switch.
2. Remove the battery.
   a. Loosen negative battery cable locking nut, and remove negative (-) battery cable (1).
   b. Open positive battery terminal cover, loosen positive battery cable locking nut, and remove positive (+) battery cable (2).
   c. Remove 2 battery pressure plate fixing bolts (3), and take off battery pressure plate.
      (Tightening torque: 7 ± 1.5 N·m)



CAUTION

- Please be careful to prevent metal tools from contacting both electrodes of battery at the same time or accidentally touching the positive electrode and vehicle body.

   d. Remove the battery.

Installation

Installation is in the reverse order of removal.

CAUTION

- Replace battery with a new one which conforms to the specifications.
- Used battery contains sulfuric acid and lead, so never discard it at will. Please dispose of it at a qualified local waste treatment station.

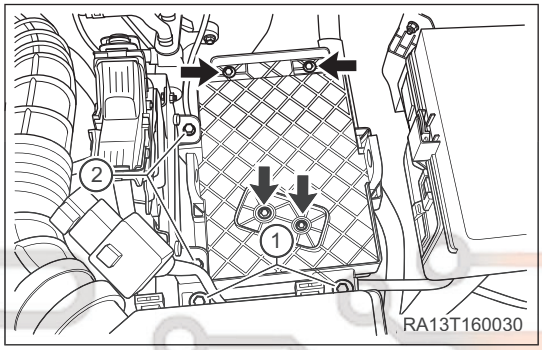
Battery Tray

Removal

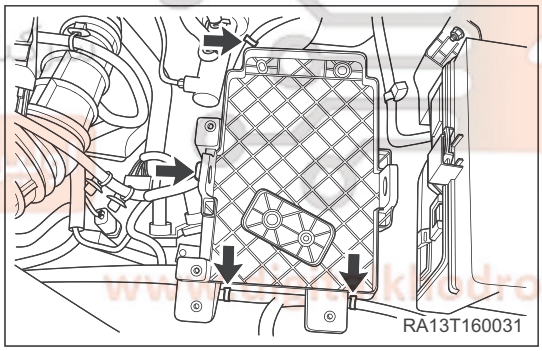
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

1. Turn off all electrical equipment and the ignition switch.
2. Remove the battery (See page 16-7).
3. Remove the battery tray.
   a. Remove 2 coupling bolts (1) between battery tray and air filter assembly.
      (Tightening torque: 7 ± 1.5 N·m)
   b. Remove 2 fixing bolts (2) between battery tray and ECU.
      (Tightening torque: 25 ± 4 N·m)
   c. Remove 4 battery tray fixing bolts (arrow).



   d. Disconnect connecting clips (arrow) between wire harness and battery tray.
   e. Remove the battery tray.



Installation

Installation is in the reverse order of removal.

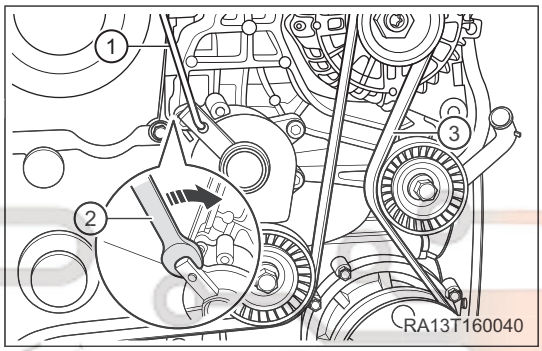
Alternator and Alternator Bracket

Removal

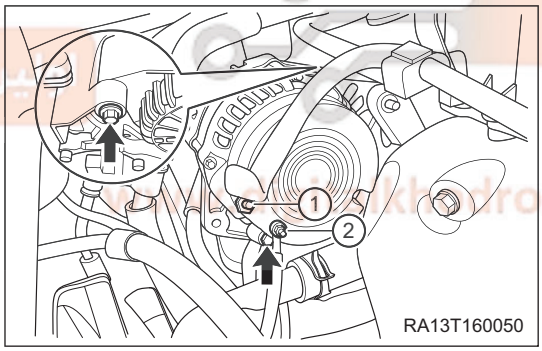
CAUTION

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

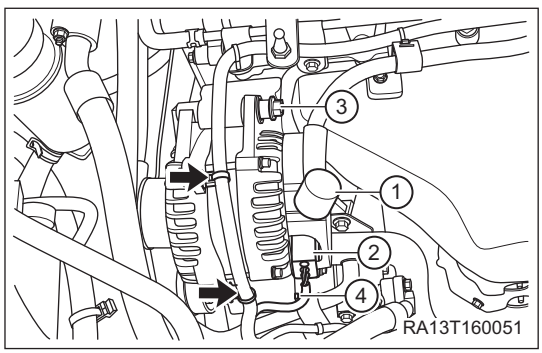
1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Move away the accessory drive belt.
   a. Using a wrench (2), turn V-ribbed belt tensioner in direction (arrow) shown in illustration, so that lock hole of tensioner is aligned with lock hole of bracket, and insert lock pin (1) at the same time to lock the tensioner.
   b. Move away the V-ribbed belt (3).



5. Remove the alternator.
   a. Move away terminal cap, remove alternator output cable fixing nut (1) and put output cable aside.
   (Tightening torque: 18 - 22 N·m)
   b. Remove alternator field coil fixing nut (2), and move away field coil.
   (Tightening torque: 8 ± 1 N·m)
   c. Remove 2 fixing bolts (arrow) from alternator.
   (Tightening torque: 25 ± 3 N·m)
   d. Remove the alternator.

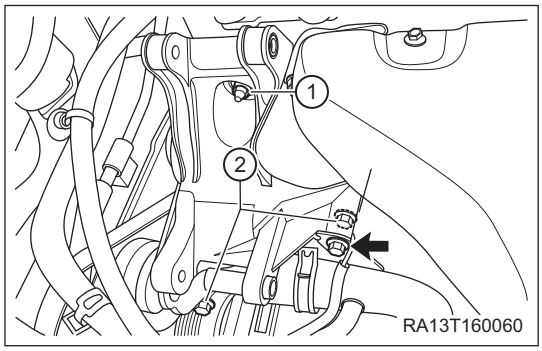


6. Remove the alternator (AT).
   a. Move away terminal cap, remove alternator output cable fixing nut (1) and put output cable aside.
   (Tightening torque: 18 - 22 N·m)
   b. Disconnect the wire harness connector (2).
   c. Disengage the wire harness clips (arrow).
   d. Remove 1 fixing bolt (3) from alternator..
   (Tightening torque: 45 ± 5N·m)
   e. Remove 1 fixing bolt (4) from alternator.
   (Tightening torque: 25 ± 3 N·m)



f. Remove the alternator.

7. Remove the alternator bracket.
   a. Remove the idler pulley (See page 07-21).
   b. Remove the tensioner assembly (See page 07-22).



   c. Remove the water pipe bracket fixing bolt (arrow).
   (Tightening torque: 20 ± 5 N·m)
   d. Remove fixing nut (1) and 2 fixing bolts (2) from alternator bracket.
   (Tightening torque for nut: 45 ± 5 N·m)
   (Tightening torque for bolt: 45 ± 5 N·m)
   e. Remove the alternator bracket.

Installation

Installation is in the reverse order of removal.

- MEMO -